

ServiceInsights

FOR INDEPENDENT SERVICE CENTERS

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JAN-MAR 2013

2013 Chevrolet Spark... New "Mini-Segment" Vehicle is Fuel-Efficient, Affordable and Maneuverable

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- > For Quality and Functionality, Use GM Radiators and Condensers
- > Genuine GM Parts Out Front in Remanufactured Engine Trend
- > 6 New Engine/Transmission Combos in Connect & Cruise
- > TechConnect with more valuable service information



News Alert:

Genuine GM Rewards expands to include powertrain assemblies. Earn unlimited rewards.



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GM ServiceInsights Headquarters
2604 N.E. Industrial Dr., #230
N. Kansas City, MO 64117
E-mail: dealersupport@proactgroup.com
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GM OE Service Parts Update

When 4WD Becomes Two, Turn To GM Transfer Cases, Actuators, and Encoder Motors

With winter bearing down across much of the nation, now may be a good time to anticipate customers asking “Where’s the four-wheel drive in my four-wheel drive vehicle?”

After months of sitting idle, an old and exposed actuator encoder motor may hesitate to cooperate. Without a nicely tuned actuator encoder motor, there’s no smooth, on-demand drive transition when the surface calls for four-wheel drive.

For GM vehicles, Genuine GM Parts new or remanufactured transfer cases, actuators and encoder motors are the very best option for ensuring satisfied customers, and are fully warranted*.

Under the best scenario, a fix might be as simple as replacing the actuator assembly, which includes the encoder motor, with a new, or remanufactured Genuine GM Part.



Whether new or remanufactured with updates, a GM transfer case assembly provides the highest level of

functionality and performance for the GM application. A full line of new and remanufactured transfer cases covers most applications of trucks and SUVs from 1995 to 2013.

With GM transfer cases, you get current OE technology in an application where it really counts. Remanufactured units, which include the actuator assembly with encoder motor, are designed to fit GM model year 1995-2009 vehicles. The remanufacturing process typically incorporates a range of new-generation components spanning snap rings, bearings, seals, chains and synchronizer rings. This allows for a simple “plug-and-play” replacement solution.

Whether an actuator assembly, encoder motor or entire transfer case assembly is needed, a Genuine GM



2007 Chevrolet Silverado
LT, Z71 Crew Cab

Parts solution, new or reman, is superior to aftermarket alternatives whose design depends on tricky reverse engineering. Specifications on both must be exact to ensure proper performance, and design and construction must be robust enough to work in demanding conditions.

Devoted 4-wheel drive vehicle owners aren’t ones to settle for half a solution. So, when they roll into your shop looking for the other half of their 4-wheel drive, don’t go halfway. Choose the competitively priced, technologically superior Genuine GM Parts solution and make your customer whole again.

*WARRANTY—GM Powertrain Components are covered by a 1-year/12,000-miles limited warranty for cataloged applications and transfer case assemblies are covered by a 3-years/100,000-miles limited warranty, whichever comes first – from date and mileage of installation by an authorized GM Dealer or qualified service center. For over-the counter sales, warranty begins on the date and mileage of retail sale.

GM OE Service Parts Update (cont'd.)

Using **Real**, Genuine GM Radiators and Condensers Ensures Quality and Functionality

Like beauty, quality is more than skin deep in the context of repairing damaged vehicles. A great repair job means using quality parts and expert installation everywhere, inside and outside.

That's why the quest for OE replacement parts like those from Genuine GM Parts shouldn't stop with door handles, headlights and the like.

One prime example is vehicle cooling system parts like radiators and condensers. While it's tempting to consider non-OE aftermarket solutions,

you're risking inadequate matching, subpar performance and installation headaches, all for questionable savings.

Now, with GM Customer Care and Aftersales' (GM CCA) renewed emphasis on putting more OE radiators and condensers into the hands of Independent Service Centers (ISCs), there's no excuse not to go with the very best.

GM CCA has been ramping up production and availability of radiators and condensers for scores of GM vehicle applications spanning dozens of popular models and model years. The components are all new – not repaired or remanufactured – and are built to the exact specifications and performance specifications that defined the products when they were originally installed.

While it's easy to think of a vehicle cooling system as comparatively "low-tech," it's one that's integral to a vehicle's performance and protection and thus shouldn't be dismissed. As with other Genuine GM Parts, radiators

and condensers carrying the GM name are built to exacting specifications and incorporate design, engineering and construction that aftermarket competitors can't match.

By comparison, there's no cutting corners in the manufacture of GM radiators and condensers. But there is some cutting of cost underway. Eager to capture more of the ISC demand for cooling system components, GM CCA is working to offer many part numbers in

the radiators and condenser line at a price competitive with aftermarket suppliers.

Many of them are included in the list of highly competitively priced repair parts available under the Bump The Competition (BTC) program. At the end of 2012, about 150 distinct radiator and condenser part numbers were available with BTC pricing offered by GM dealers.

"Our plan is to get more aggressive in the cooling system component area by emphasizing pricing as well as the message that if you're an ISC don't think about OE just in terms of the sheet metal parts," Carter says. "If you're repairing a GM vehicle and the aim is to get it back to original quality, don't forget about quality when it comes to these internal parts."

"Variables like fin counts and tube sizes, which affect a unit's cooling capacity are an example of where an OE product excels. It's vital that a repair involving radiators or condensers maintain the cooling capacity that the vehicle was built with. Reduced fin counts and different tube sizes can impact that, and that's what can happen with aftermarket versions."

Dan Carter, A/C manager, GM CCA



Connect & Cruise Grows by 6 New Engine/Transmission Combos

For 2013, Chevrolet Performance is adding six new factory-engineered engine/transmission combinations to its lineup of easy-to-order and install Connect & Cruise Crate Powertrain Systems.

Joining the LS3 6.2L, 430 hp product and the LSA supercharged 6.2L 556 hp package introduced in 2011 are two emissions-compliant E-ROD versions of those packages, as well as four LC9 5.3L 315 hp packages – a 2WD and 4WD version, as well as E-ROD versions of each of those.

\$750 and \$500 Rebates Available

Like the initial products introduced with the Connect & Cruise debut in 2011, the new entries come with attractive mail-in customer rebate offers good for purchases made through Dec. 31, 2013. Both LSA packages carry a \$750 rebate; all of the others qualify for \$500 rebates.

Connect & Cruise simplifies both the process of selecting and ordering performance powertrain packages and installing them. By specifying just a single part number, enthusiasts looking to upgrade to an OE performance solution get a matched engine and transmission combination, as well as electronic modules, wiring harnesses, torque converters and other components required for a complete installation.

“It’s a turnkey operation for the customer,” says David MacWebb, product specialist with Chevrolet

Performance. “Instead of having to go out and buy every separate piece or go the aftermarket route, we offer a complete package that offers the convenience of a crate engine solution and the assurance of factory-validated performance, along with the certainty that all of the parts will work together seamlessly.”

Solid demand for the initial Connect & Cruise entries, as well as an interest in incorporating the E-ROD into the mix, led Chevrolet Performance to expand offerings in the product lineup.

“We’ve had a very positive response, and there was a lot of buzz about Connect & Cruise at last year’s Specialty Equipment Market Association’s (SEMA) show where we displayed some of the packages,” MacWebb says.

Connect & Cruise rebates, available only to the end user, come in the form of VISA® prepaid cards that can be used like cash at merchants that accept the card. Customers must fill out a rebate form supplied by the Chevrolet Performance dealer supplying the product, and furnish copies of the invoice/repair order.



The image shows a brochure for Chevrolet Performance's Connect & Cruise Crate Powertrain Systems. The brochure features a large image of an engine and transmission assembly. Below the image is a table listing various engine and transmission combinations with their respective part numbers and prices. The table is organized into columns for different engine/transmission pairs. The brochure also includes a section for a mail-in rebate, stating that customers can receive \$500 or \$750 in mail-in rebates. A separate form is shown next to the brochure, which is used for requesting the rebate. The form includes fields for customer information, dealer information, and a section for the dealer to fill out. The form also includes a section for the customer to fill out, including a section for the customer to provide their contact information and a section for the customer to provide their dealer's contact information.

Engine/Transmission	Part Number	MSRP	Rebate
LS3 6.2L / 6-Speed Manual	19050001	\$4,999.00	\$750.00
LS3 6.2L / 6-Speed Automatic	19050002	\$5,499.00	\$750.00
LSA 6.2L Supercharged / 6-Speed Manual	19050003	\$6,999.00	\$750.00
LSA 6.2L Supercharged / 6-Speed Automatic	19050004	\$7,499.00	\$750.00
LC9 5.3L / 6-Speed Manual	19050005	\$3,999.00	\$500.00
LC9 5.3L / 6-Speed Automatic	19050006	\$4,499.00	\$500.00
LC9 5.3L E-ROD / 6-Speed Manual	19050007	\$3,999.00	\$500.00
LC9 5.3L E-ROD / 6-Speed Automatic	19050008	\$4,499.00	\$500.00

The Technical Side

Genuine GM Parts Out Front in Remanufactured Engine Trend

They say you can never go home again, but thousands of installed GM engines are proving that's not always so.

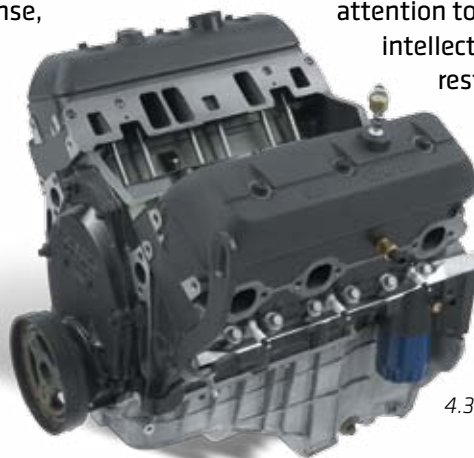
The lucky ones, those that haven't been terribly abused or heavily damaged, do return home in a sense, entering the rigorous GM rehabilitation program that can lead to another life as GM remanufactured engines.

But the luck, really, is with the GM vehicle owner and the independent service center that may have the opportunity to install a GM reman engine.

Painstakingly refurbished and updated, competitively priced and carefully crafted to restore or even exceed original factory condition, a GM reman engine is the next best thing to a new GM engine. In today's market, they're an especially attractive alternative to not only "new," but also a rebuilt or reman product from non-OE aftermarket competitors.

Remanufactured engines offer more bang for the buck than rebuilt engines for customers looking to extend their vehicle life. Broader in scope than rebuilds that typically involve simply repairing what may be evidently "broken" and linked to failure, GM remans involve a comprehensive rehab that can include new or restored parts, some level of dismantling, cleaning, remachining, testing and updating that can enhance the engine's capabilities. For all intent and purposes, a reman engine has a new long-term lease on life; a rebuilt engine can be more of a month-to-month proposition.

But not all reman engines are created equal. Expertise, attention to detail, processes, know-how and intellectual property all come into play in engine restoration and help determine quality and performance. Remans from OE manufacturers like GM come with greater assurances that they're near carbon copies of the original engine, not products of reverse



4.3L V6 Reman Engine

Continued on page 7.



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Upcoming 2013 Testing Dates

- Registration – March 1 thru May 21, 2013
- Testing – April 1 thru May 31, 2013
- Registration – June 1 thru August 21, 2013
- Testing – July 1 thru August 31, 2013

New Bi-Fuel Gasoline and CNG Pickup Trucks

The flexibility of choosing a different fuel altogether may be the best choice in the ongoing battle with unpredictable fuel prices. In the new 2013 Chevrolet Silverado and GMC Sierra 2500 HD bi-fuel pickup trucks, gas is gas — whether it's gasoline or Compressed Natural Gas (CNG) — and either fuel can be used with the push of a button. The 6.0L V8 engine can run on gasoline or CNG and seamlessly transitions between the two fuels without any loss of performance or fuel economy. The CNG and gasoline tanks have a combined range of 650 miles.

The bi-fuel system is designed for primary operation on CNG as long as there is sufficient fuel in the CNG fuel tank. The trucks feature a 17.5 GGE, gasoline gallon equivalent, (66.2 L) CNG tank and a 36 gallon (136.2 L) gasoline tank.

Bi-Fuel Engine

The 6.0L V8 engine uses an Engine Control Module (ECM) with both gasoline and CNG calibrations to ensure all engine operating parameters are within acceptable performance operating limits. The engine is designed to meet strict Environmental Protection Agency (EPA) and California Air Resources Board (CARB) certification. It features a gasoline fuel injection system and a CNG fuel injection system.

The hardened bi-fuel engine provides the same durability as a gasoline only engine. The hardened engine components for CNG fuel use include hardened intake and exhaust valve seats and hardened exhaust valves.

The engine always starts on gasoline. When the engine reaches a pre-determined operating temperature it seamlessly switches over to the CNG fuel system. If the CNG fuel is depleted, the



system automatically switches over to the gasoline system.

A minimum gasoline level of at least one-quarter tank should always be maintained. To protect engine components, a switch to gasoline may occur at any time. The vehicle will not start if the engine stalls due to a lack of gasoline.

Switching Between Fuels

The CNG fuel mode switch and LED fuel gauge is located on the center of the instrument panel. The CNG fuel gauge indicates how much CNG is left

in the tank. CNG quantity is affected by changes in fuel temperature and fuel pressure.

The single light at the top of the switch indicates which fuel system (mode) is currently in operation. Red indicates gasoline mode and green indicates CNG mode. When the system is changing from gasoline to CNG, the indicator will turn orange for a few seconds.

Four lights are at the bottom of the switch. The number of illuminated lights indicates the CNG fuel level.

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New Bi-Fuel Pickup Trucks

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Four lights indicate a full tank (approximately 3,600–3,100 psi; 24,800–21,400 kPa) while only one light indicates the fuel level is less than a quarter tank full (approximately 1,000–500 psi; 6,900–3,450 kPa).

The driver can press the center of the switch to change fuels at almost any time. The fuel mode can be changed almost any time the ignition is ON, or the engine is running.

CNG Fuel Supply

The CNG fuel supply and metering system consists of the following components:

- CNG 1/4 turn isolation valve (manual shut-off valve)
- Alternative fuel rail pressure/temperature sensor
- CNG coalescing fuel filter
- CNG cut-off solenoid valves (2 solenoid valves)
- Engine Control Module (ECM)
- Excess flow valve
- Fill line check valve
- Fill filter
- Fill valve (NGV1 fill receptacle)
- Fuel injectors/injector hoses
- Fuel Injector Control Module (FICM)
- Fuel injector rails
- Fuel mode switch
- CNG fuel pressure regulator
- Fuel pump disable module
- CNG fuel tank
- CNG Fuel Tank Pressure (FTP) sensor
- CNG fuel tank temperature sensor

- CNG tank Pressure Relief Device (PRD) (2 devices)
- High pressure line and hose (stainless steel tubing and stainless steel jacketed PTFE hose)
- LED fuel gauge
- Low pressure fuel line and hose (stainless steel tubing and stainless steel jacketed PTFE hose)

The high pressure fuel system is equipped with a manually operated 1/4 turn isolation valve (manual shut-off valve), located in the high pressure supply line near the CNG fuel tank outlet on the driver's side of the vehicle. The purpose of the valve is to isolate the high pressure side of the fuel system for some service procedures. If this valve is inadvertently left in the OFF position, the vehicle will not operate in CNG mode. Turn the manual shut-off valve 90 degrees to turn OFF the CNG.

The coalescing fuel filter is located between the front CNG cut-off solenoid valve 1 and the 1/4 turn isolation valve (manual shut-off valve). It contains a 6 micron filter element and a drain fitting. The filter is designed to trap contaminants and liquids that may damage the fuel injectors. It must be periodically inspected, drained and replaced.

CNG Operation

The FICM controls the three operating modes of the bi-fuel system. In gasoline mode, the fuel injector and fuel pump control signals are bypassed through the FICM to the proper components, allowing the vehicle to operate the same as a conventional vehicle.

In change-over mode, the FICM supplies voltage to the CNG cut-off solenoid valves, opening them at the CNG fuel tank and the pressure regulator, which allows the CNG system pressure to adjust to the normal operating pressure from the tank to the injectors. The FICM will then switch off the gasoline injectors sequentially beginning with cylinder #1. The appropriate CNG injectors are switched on sequentially as each gasoline injector is switched off.

Once the engine is operating in CNG mode, the gasoline fuel pump is switched off by the FICM. The ECM performs all injector pulse and ignition

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ACDelco 360 represents our mission to look at our businesses at every possible angle to provide value and assistance to our distributors and their customers as well as offer a full circle of support with programs, tools, training and marketing focused on enhancing and growing our partnership successfully.

Publisher:

Rick Balabon
ACDelco

E-mail

richard.balabon@gm.com

Editor:

Greg St. Aubin
ACDelco

E-mail

gregory.staubin@gm.com

Technical Editor:

Mark Spencer

E-mail

m Spencer@gpworldwide.com

Production Manager:

Marie Meredith

Desktop Publishing:

5by5 Design LLC

E-mail

dkelly@5by5dzn.com

Write to:

ACDelco TechConnect
P.O. Box 500
Troy, MI 48007-0500

On the Web:

To read and search recent issues of *TechConnect* online:

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ACDelco service tips are intended for use by professional technicians, not a "do-it-yourselfer." They are written to inform those technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions and know-how to do a job properly and safely. If a condition is described, it cannot be assumed that the information applies to all vehicles or that all vehicles will have that condition.

All materials and programs described in this magazine are subject to change. Submission of materials implies the right to edit and publish. Inclusion in the publication is not necessarily an endorsement of the individual or the company.

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ACDelco Featured on Two Guys Garage

ACDelco, in association with Federated Auto Parts, was recently featured on Two Guys Garage, the vehicle repair, customizing and restoration show hosted by Kevin Byrd and Willie B. on the SPEED channel.

The episode, Time for a Change (#1115), has aired several times recently. It also can be viewed any time on <http://twoguysgarage.com>. Click the Episodes link to search for the show.

On this episode, a 2003 Cadillac CTS



with 117,000 miles is inspected and repaired before it is transferred to a

college-bound daughter. A complete roster of maintenance and repair components are used on the car, along with a few ACDelco tools, including our latest inspection camera. Product highlights include ACDelco Professional DuraStop brake components and an ACDelco Professional Silver battery.

Be sure to check out this great episode and share it with your ACDelco customers.

– Thanks to Curt Collins

Complete Timing Chain Replacement Kits Available

ACDelco has introduced complete, Original Equipment Service timing chain replacement kits for 2007-2012 GM high-feature V6 engines. The kits, which include all the components needed to replace the timing chain, incorporate all of the latest product updates, design upgrades and any service bulletin concerns issued since the original engines went into service.

Kits include the primary and secondary timing chains, bolts, seals and seal kits, tensioners and gaskets. All parts in the kits are 100-percent new, and are backed by a 12-month, 12,000-mile warranty.

The part numbers and applications are:

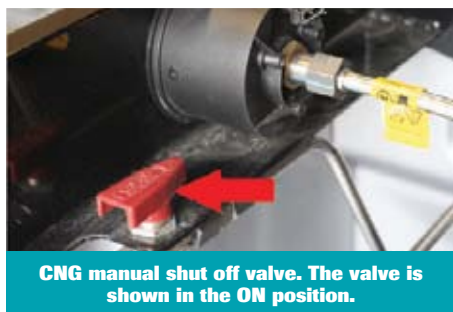
ACDelco Kit Number	Application
12650230	2007 models (RPO LY7, LP1)
12650231	2008-2012 models (RPO LY7) 2010-2012 models (RPO LAU)
12651450	2008+ models RPO LLT) 2010+ models (RPO LF1, LFW, LFX)



For more information about ACDelco timing chain replacement kits, contact your local ACDelco representative.

– Thanks to Rick Balabon

New Bi-Fuel Pickup Trucks – continued from page 2



timing calculations to ensure proper engine performance.

The Tech 2/MDI scan tools are used for vehicle diagnosis. Diagnostic Trouble Codes (DTCs) are the same as with gasoline only engines.

There are two cut-off solenoid valves. When they are not energized, these solenoids close an internal valve to block

the flow of CNG. The front CNG cut-off solenoid valve 1 is integrated with the CNG fuel pressure regulator assembly. The rear high pressure CNG cut-off solenoid valve 2 is located near the CNG fuel tank outlet.

A 40 micron filter is integrated with the fill valve to help prevent contaminants from entering the CNG fuel system during refueling. When the filter becomes restricted, the amount of time required to refill the CNG tank will increase.

The CNG fill valve (receptacle) is a NGV1 profile and mates to any NGV1 fill dispenser valve. The fill dispenser seals to the receptacle with an internal O-ring. The fill valve is mounted in the side of the CNG fuel tank cover. Remove and reinstall the fill valve dust cover when refueling.

The CNG fuel tank, located at the front of the truck bed, is constructed of aluminum liner wrapped in carbon fiber and conforms to NGV2-2000 (Type 3) specifications. The CNG cut-off solenoid valve 2 is threaded into the outlet end (driver side) of the fuel tank and is used to prevent fuel flow during non-operational running conditions. The service life of a Type 3 CNG fuel tank is 15 years from the date it was manufactured. Metal shields are used to protect the tank from road debris or other contact conditions that may occur.

All service parts, including the gaseous fuel components, are available through the GM parts distribution system.

– Thanks to Sherman Dixon and Chris Graham

Counterfeit Airbag Modules

The National Highway Traffic Safety Administration (NHTSA) recently issued a consumer safety advisory to announce that counterfeit airbags have entered the U. S. from China. Counterfeit airbags may not deploy or perform in the same manner as GM-supplied replacement airbags. GM strongly recommends that suspected airbags be replaced.

A unique GM customer assistance phone number has been established to answer owner questions. Concerned customers in the U.S. may call 1-866-237-3601.

GM service bulletin #12-09-41-001A can help in the identification of counterfeit airbag modules for the GM vehicles identified by NHTSA that may be affected, which include the 2010-2011 Buick LaCrosse, 2006-2010 Chevrolet Aveo, and 2011-2012 Chevrolet Camaro, Cruze and Volt.

Vehicles purchased new that have never had the airbags replaced are not at risk. Vehicles purchased new that have had the air bags replaced with genuine GM airbags at an authorized dealer (new car sales) also are not at risk. For all other scenarios, a physical inspection may be the best way to identify whether the airbag module installed is the proper Original Equipment Manufacturer (OEM) airbag.

Based on the information provided to GM, the counterfeit airbag modules are being manufactured from a collection of reclaimed components with some new or remanufactured parts. Due to this "piecing together" of available parts, there may be a wide variety of appearance and functional differences between each individual counterfeit module.

Inspection

When inspecting an airbag module, it's necessary to remove the module to evaluate whether it is an authentic GM part. The following are immediate signs of a possible counterfeit module:

- The airbag light should illuminate during "key on" and turn off after the vehicle is started. A glowing airbag light indicates a functional problem with the airbag module. The lack of an airbag light during "key on" may indicate the bulb has been disabled to prevent the customer from being alerted to a problem with the module.
- The vehicle horn should function. A lack of a horn may indicate the

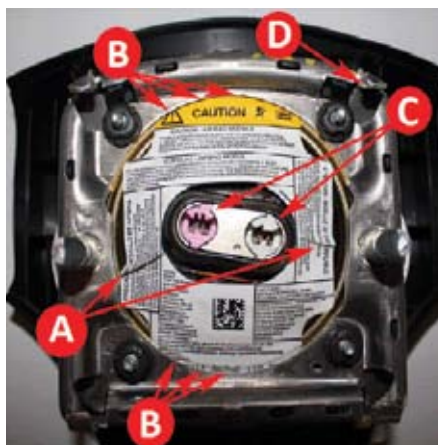
air bag module horn contacts are incorrectly placed, or missing from the module.

- The emblem on the airbag cover may not match the size, shape, texture or color of a known genuine GM airbag module.
- The letters of the word "airbag," which are embossed or molded into the vinyl trim cover may not be well-defined.
- The texture of the vinyl material used for the counterfeit air bag trim cover varies from the OEM material.
- There may be evidence that the counterfeit airbag installer shaved or trimmed the vinyl trim cover for better fit into the steering wheel housing.
- The inflator assembly is labeled with a different OEM name than the airbag's emblem or intended vehicle brand.

Identifying Counterfeits

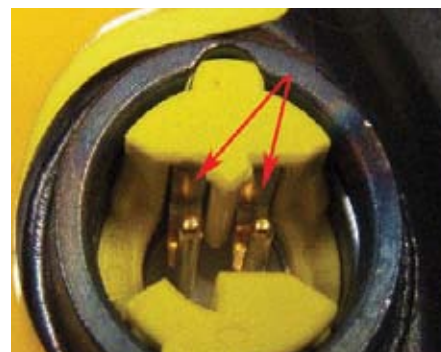
Once the airbag module is removed, there may be several clues that identify a counterfeit airbag module. These visual indications may be more useful as opposed to confirming part numbers or molded-in identifiers since the counterfeiter may have reproduced a correct part number or have correct molding marks because some portion of the module may be a reclaimed OEM component.

The following airbag module photo is a confirmed counterfeit part. Please note the following:



- A. Folded-over label**
- B. Label tucked behind backing plate**
- C. Electrical connectors should match vehicle connectors**
- D. Additional holes**

- The caution label applied to the back of the module is the incorrect size and shape for the module. In order to place it in the intended location the label had to be folded over (A) in two places. Additionally, caution labels, will not be tucked under the backing plate (B) as shown.
- The electrical connectors (C) on the back of the airbag module will be color coded and match the connector color on the vehicle side. These connectors are keyed for each vehicle application and should not show any signs of being re-machined or tampered with.
- Examine the module for tool marks visible on the fasteners and/or grinder marks visible on the air bag backing plate. A counterfeit air bag may have numerous holes (D) drilled/cut into it, which allows the counterfeit air bag to be installed into a wider range of vehicles.



Shorting bars on a genuine GM airbag module.

Missing Shorting Bars

The airbag modules also should be equipped with shorting bars incorporated in the electrical connectors. Grounding terminals, or "shorting bars," on the inflator wire connectors, which prevent the air bag from deploying when disconnected from the vehicle system, that are missing is a sign of a counterfeit airbag. The shorting bars appear as a gold plated U-shaped piece of metal.

For additional information about inspecting for counterfeit airbag modules, including specific details for identified GM vehicles, refer to service bulletin #12-09-41-001A.

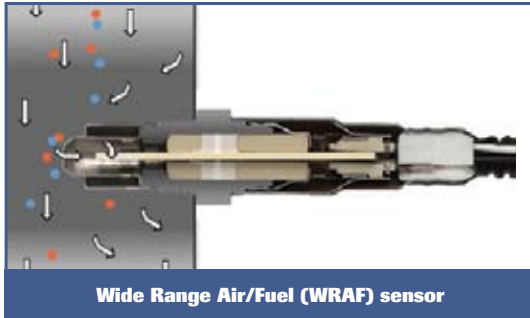
If your customers would like more information about this counterfeit airbag modules issue, refer them to www.safercar.gov.

– Thanks to Rick Balabon

Wide Range Air/Fuel Sensors

Since wideband oxygen (O₂) sensors, or Wide Range Air/Fuel (WRAF) sensors, were introduced in the late-1990s, they have become critical parts of the modern engine management system that is required to meet ever lower emission targets and higher fuel economy goals — all without compromising engine performance.

WRAF sensors can gauge how much oxygen is in the exhaust stream, which enables the Engine Control Module (ECM) to precisely gauge combustion mixtures and effectively manage the combustion process.



Wide Range Air/Fuel (WRAF) sensor

For a review of conventional heated oxygen (O₂) sensors, refer to the May-June issue of *TechConnect*.

Enhanced Accuracy

WRAF sensors are different from conventional switching oxygen sensors. WRAF sensors incorporate both an oxygen-pumping cell and the more familiar conventional switching oxygen-sensing cell. WRAF sensors are a planar type (the flat plane shape of the sensing element) and consist of an oxygen sensing cell, an oxygen pumping cell and a heating element. The wiring harness of a WRAF sensor typically has five or six wires.

As with all oxygen sensors, the WRAF sensor measures the amount of oxygen in the exhaust system but measures a wider range more quickly and more accurately. This allows the fuel control system to stay closed-loop during more conditions than a conventional switching-style oxygen sensor, including:

- High power and engine protection modes where enrichment is necessary
- During light-off or after-start modes, reducing cold start emissions

Depending on the application, the fuel control system status will still go into open-loop during some operating conditions (e.g., deceleration, faulted states).

Sensor Design

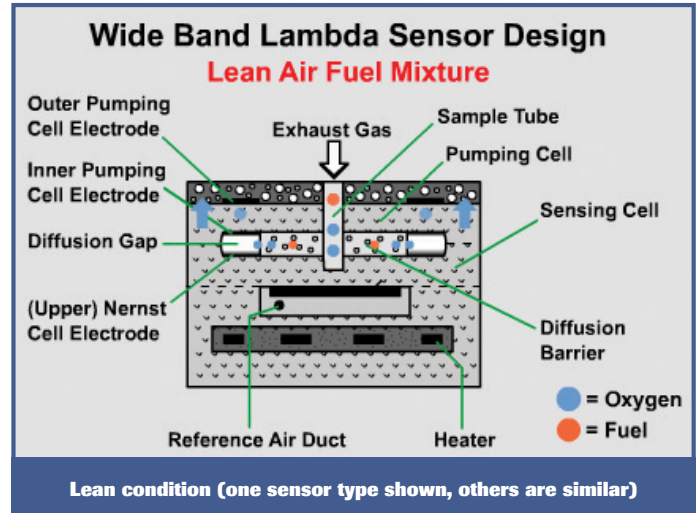
The WRAF sensor heater is pulse-width-modulated and is used to keep the sensor around 800°C, with an operating range of 600°C to 950°C. Temperatures over 950°C can damage the sensor.

A trim resistor is incorporated into the WRAF sensor connector to calibrate the sensor during assembly. The trim resistor is either laser-etched or added into the connector at the end of the manufacturer's assembly line to change its resistance and output current. The overall effect shifts the sensor output response to the appropriate level specified for the application.

During engine operation, the exhaust gas travels through the diffusion barrier into the diffusion gap between the

sensing cell and the pumping cell. The ECM will keep the diffusion gap mixture at lambda value of 1 (14.7:1 air-fuel ratio) by pumping oxygen ions into or out of this gap using the pumping cell.

The ECM determines how much pumping current is needed by monitoring the oxygen sensor sensing cell value. A lambda value of 1 corresponds to a conventional sensor reading of 450mV. Therefore, the required pumping current is an indicator of how rich or lean the exhaust gas is at any particular time.



Compared to a conventional switching sensor, using a WRAF sensor informs the ECM of exactly how rich or lean the air-fuel ratio is. A conventional switching oxygen sensor will only indicate if the air-fuel ratio is lean or rich.

Scan Tool Parameters

The scan tool parameters associated with the WRAF sensor is different than the parameters associated with a conventional sensor. For a WRAF oxygen sensor, the scan tool displays O₂ sensor readings in lambda.

Lambda equals the actual air-fuel ratio divided by the stoichiometric air-fuel ratio. A lambda value greater than 1.0 indicates a lean condition and a lambda value less than 1.0 indicates a rich condition.



The scan tool lambda value indicates a lean or rich condition.

If the ECM detects an excessively lean or rich condition, the ECM will set a fuel trim Diagnostic Trouble Code (DTC).

— Thanks to Rick Balabon

New GM Vehicle Communication Interface Package Subscription

ACDelco is updating its service programming and diagnostics application subscriptions by adding a new annual GM Vehicle Communication Interface Package.

The new package includes a 1-year subscription to the Global Diagnostic System 2 (GDS 2) and Tech2Win for \$750.

GDS 2 software is required for communicating and diagnosing new GM vehicles using the GM Global Architecture (includes the current generations of the Chevrolet Camaro, Equinox, Cruze, Volt, Sonic, Malibu and Captiva; Buick LaCrosse, Regal and Verano; GMC Terrain; Cadillac SRX, ATS and XTS). It replaces the Tech 2 scan tool.

GDS2 works with menu-driven commands using a standard Windows® interface on a Personal Computer (PC). It enables much more data to be viewed from many different perspectives and offers enhanced data features.

Tech2Win is a PC-based application version of the Tech 2 and CANdi (Control Area Network diagnostic interface) module.

To use either GDS 2 or Tech2Win, a Multiple Diagnostic Interface (MDI) tool is required.

Access to the GM Service Programming System, GM vehicle calibrations, Tech 2 scan tool diagnostic software updates and GDS 2 software updates are available online through a TIS2Web subscription.

Every subscription includes access to the ACDelco eBusiness and TIS2Web Helpdesk — the same assistance provided to dealerships — for issues with software and programming. For assistance, call 1-888-212-8959.

– Thanks to Bob Stewart



GM Calibration and Diagnostic Software	
Complete GM Service Support Package	\$3,100 per year
GM Service Information, TIS2Web – All Access, GDS 2, and Tech2Win	
Tech 2 and Service Programming Package	\$1,395 per year
Tech 2 diagnostic software updates, Tech 2 View, Tech 2 Snap Shot, Service Programming Software, and Tech2Win	
Service Programming Only	\$55 for 2 days
Vehicle calibration software	\$275 for 3 months \$995 per year
Tech 2 Diagnostics	\$750 per year
Tech 2 diagnostic software updates	
GM Global Diagnostic System 2	\$55 for 3 days
Diagnostic software for GM Global A vehicles	\$225 for 1 month \$550 per year
Tech2Win	\$55 for 3 days
Tech 2 software on a PC	
GM Vehicle Communication Interface Package	\$750 per year
GDS 2 and Tech2Win software	

ACDelco Support for Tech2Win

Several diagnostic tool manufacturers have recently added ISO 22900 PDU API (International Organization for Standardization 22900 Protocol Data Unit Application Programming Interface) functions and software/hardware to their SAE J2534 diagnostic scan tools. These companies may state that the new software/hardware allows their J2534 devices to use Tech2Win, the PC-based application version of the Tech 2 and CANdi (Control Area Network diagnostic interface) module, which is built on the ISO 22900 PDU API standard.

Technicians requiring technical support for these non-GM tools should direct inquiries to the tool manufacturers. ACDelco offers support for the Tech 2 scan tool and Multiple Diagnostic Interface (MDI) tool, but

does not provide support for non-GM tools.

ISO 22900 specifies the common software interface for diagnostic software applications. The purpose of the standard is to ensure that an application can operate on a common interface to communicate with a manufacturer's network protocol and vehicle bus systems.

Tech2Win can be loaded onto a service center's Personal Computer (PC) or notebook computer through a TIS2Web subscription. A MDI tool also is required. Using Tech2Win enables technicians to take advantage of the computer power of the PC or notebook computer and the speed of the MDI, providing faster operation than a Tech 2.



Go to www.acdelcotechconnect.com and click the GM Service Information link on the left side of the home page for more information.

For Tech 2 and MDI technical support, contact the ACDelco eBusiness and TIS2Web Helpdesk at 1-888-212-8959.

– Thanks to Bob Stewart

The following technical tips provide repair information about specific conditions on a variety of vehicles. If you have a tough or unusual service repair, the **Diagnostic Hotline** can help. Call **1-800-825-5886, prompt #2**, from 8 a.m. to 8 p.m. ET Monday-Friday, to speak with a technical expert with the latest OEM information.

Timing Belt Installation

2001-2005 Honda Civic equipped with the 1.7L 4-cylinder engine

Incorrect tensioner position and improper belt tension can result in a violent correction of the tensioner position and damage to the tensioner, spring and belt. Improper belt tracking also can cause interference with other components.

Improper belt setup — turning the crankshaft clockwise during initial setup — can damage the tensioner spring. The spring must be in the up position, noted on the spring rubber dampener.

During setup, the crankshaft must be rotated two turns counterclockwise with the locking pin in the tensioner and the attachment bolt loose.



Rotate the crankshaft two turns counterclockwise.

In addition, for 2001-2003 models, a longer fastening bolt may be required. Honda upgraded the timing belt tensioner assembly in late 2002. The bolt length was increased to 54mm to allow for proper thread engagement. The



**Old bolt: 50.6mm
New bolt: 54mm**

ACDelco kit follows the design change and includes the updated bolt.

Winter Tires

Many late model GM high performance vehicles are factory equipped with tires that are optimized for maximum dry and wet road performance while still retaining satisfactory tread life, durability and low noise levels. In severe winter climates where snowfall may be significant, these tires may be found to provide less traction. Winter tires may enhance winter driving in these conditions.

GM performance-oriented vehicles that are rear-wheel drive take advantage of the natural weight shift rearward during acceleration, increasing dry road traction on the driven wheels. Rear-wheel drive also contributes to neutral steering as it takes the burden off the front wheels to both power and turn the vehicle. The connection between the steering and the powertrain is also eliminated, removing any tendency for engine power to influence the steering under heavy acceleration or rough roads.

Generally, front-wheel drive vehicles offer additional winter traction due to the weight of the engine/transaxle sitting directly above the driving wheels, and are found to be satisfactory for winter driving when factory equipped with all-season tires.

On all vehicles, if a decision is made to switch to winter tires, all four tires must be replaced. When selecting winter tires, keep the same size and aspect ratio as the original equipment tires unless otherwise directed by the manufacturer. Deviating from the original size may create clearance issues, speedometer error and/or alter the handling characteristics of the vehicle.

If winter tires are not available in the same speed rating as the original equipment tires, do not exceed the speed rating of the winter tire chosen.

Winter tires, in general, are optimized for increased traction on snow and ice. In some instances, this may translate into decreased dry road traction, increased road noise and shorter tread

life. Recommend to customers to drive cautiously after switching tires and to get acclimated to the new handling and braking performance characteristics.

Corrosion Protection of Metal Panels

When an aftermarket accessory is installed on a vehicle, where drilling holes into metal body panels or supports on the vehicle is required, it's critical to maintain proper corrosion protection. Any time a metal surface is disturbed, such as by drilling a hole for a fastener, the corrosion resistance of that panel is compromised.

One of the best ways to protect the fastener-to-panel mounting holes from future corrosion is to use GM Vehicle Care Super Lube® with PTFE (Polytetrafluoroethylene). This is the only product recommended by GM for the corrosion protection of metal panels where fasteners will be added to metal panels.

When installing accessories, apply Super Lube to any hole and fastener before installing the fastener into the drilled attaching hole or inside the metal panel.



Product Information

For free technical assistance and product information regarding specific ACDelco products, contact these toll-free information hotlines staffed by ASE-certified technicians:

Brakes – 1-888-701-6169 (prompt #1)

Chassis – 1-888-701-6169 (prompt #2)

Clutches – 1-888-725-8625

Lift Supports – 1-800-790-5438

Shocks – 1-877-466-7752

Starters and Alternators –
1-800-228-9672

Steering (Pumps, Rack and Pinion, Gears) – 1-866-833-5567

Wiper Blades – 1-800-810-7096

How to Take ACDelco Training

Go to www.acdelcotechconnect.com and click the Training tab to log in to the ACDelco Learning Management System (LMS).

- To enroll in **courses in your training path**, open the home page to view your Training Progress Status Report, select Click Here to Show Detail, and then click the course number and title to view details on a specific course and to launch or enroll in the course.
- To enroll in an **Instructor-Led Training (ILT)** course (ILTs are full-day hands-on classroom courses), click Take Training > Instructor-Led Training to view the catalog and select a specific course.
- To enroll in a **Virtual Classroom Training (VCT)** course (VCTs are 1-2 hour live online courses), click Take Training > Virtual Classroom Training to view the catalog and select a specific course.
- To launch a **Web-Based Training (WBT)** course (WBTs are 1-4 hour self-guided online courses), click Take Training > Web-Based Training to view the catalog and select a specific course.
- To launch a **TechAssist (TAS)** course (TAS courses are 15-20 minute online presentations on a specific topic), click Take Training > TechAssist to view the catalog and select a specific course.
- To launch a **Simulation (SIM)** (SIMs require users to complete all repairs for a condition), click Take Training > Simulations to view the catalog and select a diagnostic challenge simulation.

Training Schedule

To search for currently scheduled courses in your area, view the Training in Your Area section on the Home page. Select search terms from the dropdown menus and click the Submit button.

– Thanks to Greg St. Aubin

Current Instructor-Led Training Courses

The following ILT courses are currently being scheduled:

Course Number	Course Name
S-AC07-03.01ILT	HVAC Control System Operation and Diagnostics
S-BK05-01.01ILT	Braking Systems
S-BK05-02.01ILT	ABS Operation and Diagnosis
S-EL06-04.02ILT	Network Communication Diagnosis
S-EL06-10.02ILT	Electrical Power Management
S-EL06-11.02ILT	Enhanced Automotive Circuit Diagnosis
S-EL06-12.01ILT	Hybrid Technology and Service
S-EL06-13.01ILT	Body Electrical Global Diagnostics
S-EL06-14.01ILT	Advanced Body Control System Electrical Diagnostics
S-EP08-02.01ILT	Engine Performance Computer Controls and Ignition System Diagnostics
S-EP08-03.01ILT	Engine Performance Air Induction and Fuel System Diagnostics
S-EP08-04.01ILT	Engine Performance Fault Monitoring and Emission System Diagnostics
S-EP08-05.01ILT	Engine Performance Advanced Drivability Diagnostics
S-EP08-06.01ILT	After Combustion Sensors
S-EP08-08.01ILT	Evaporative Emissions Controls
S-EP08-09.01ILT	Spark Generation
S-EP08-81.01ILT	Duramax 6600 Diesel Engine Performance
S-EP08-81.02ILT	Duramax Diesel Operation and Diagnosis
S-SS04-01.01ILT	Vibration Correction Diagnostics
S-ST10-01.01ILT	Supplemental Restraint Systems

Current Virtual Classroom Training Courses

The following VCT courses are currently being scheduled:

Course Number	Course Name
S-AC07-02.01VCT	HVAC System Operation and Service Hints
S-AC-07-03.01VCT	HVAC System Flushing, Recovery and Diagnostics
S-EL06-03.01VCT	Serial Data Communication Networks
S-EL06-04.01VCT	Communication Network Diagnosis
S-EL06-06.01VCT	Two-Mode Hybrid System Safety and Special Tools
S-EL06-07.01VCT	Two-Mode Hybrid System Diagnosis and Repair
S-EM01-02.01VCT	Active Fuel Management Operation
S-EM01-03.01VCT	Active Fuel Management Diagnosis
S-EP08-01.01VCT	6.6L Duramax Engine Diagnosis
S-EP08-02.01VCT	6.6L Duramax LMM Diesel Engine
S-EP08-03.01VCT	6.6L Duramax LGH and LML Diesel Engines

TechConnect Reader Survey Ends Soon

TechConnect provides technicians with the latest technical news and information from ACDelco and the automotive industry. We cover a wide range of topics, including technical information and programs from ACDelco, GM, Professional Service Center Program partners, tool suppliers and more.

To help in developing future issues

of TechConnect, we'd like to hear from you. Go to the link below to take a short survey about what automotive-related -service news and information you want most in TechConnect.

Your input is very important to us. Thanks for taking the time to complete the survey.

– Thanks to Rick Balabon



To take the survey, scan the QR code with your smartphone or go to

<https://www.onlineconsumersurveys.com/R.aspx?a=616>

The Technical Side (cont'd.)

(Cont. from page 6)

engineering or mere approximations of original quality and specifications. When GM backs it, in the form of 3-years/100,000-miles warranties*, OE remans are certain to have been put through the paces.

“Our reman engines are as close to the OE production alternative that you can get. The same high level of quality, specifications and performance standards that goes into our production engines goes into our remanufactured products.”

Tracy Lucas, manager, engine service and remanufacturing, GM Customer Care and Aftersales (GM CCA)

GM ensures that by elevating the reman engine line to a status on a close par with production engines. Reman product specialists work closely with GM Powertrain engineers so that reman engine production benefits from the same knowledge and expertise that goes into new engine development. In addition, essential suppliers that furnish engine intake, testing, parts and engine remanufacturing services are brought directly into the GM reman business as partners that lend their expertise to continuously improving the complex, multi-stage process of remanufacturing engines.

“We bring all of our reman partners into our new-engine production facilities so they have the knowledge needed to mimic our quality control, machining and other processes,”

Lucas says. “The relationship with our partners goes well beyond having someone on the outside casually observing what we do internally.”

That level of commitment to quality has helped accelerate the rapid growth of GM’s reman engine business. GM launched its reman effort seven years ago with two V6 engine families. Since then, many more have been added and the time frame from production to reman on other engine families is shortening.

“Our goal on glide path from production to reman has been coming down to between 24 and 36 months,” Lucas says. “Within two years, our target is to have some 2012 model-year engines available in reman versions.”

With drivers demanding more of their vehicles and engines today, the market for replacement engines is only likely to grow. Grabbing a share of that business will require an ability to offer more than just a range of solutions; it will demand products that blend quality, reliability, proven performance and value. Few solutions combine all of those attributes better than a GM reman engine.

Next Quarter in Insights: What makes GM’s reman process stand out.

POWERTRAIN WARRANTY – 3-years/100,000-miles limited warranty for Genuine GM Parts Engines. Warranty covers parts and labor for cataloged applications, whichever comes first – from date and mileage of installation by an authorized GM Dealer or qualified service center. For over-the-counter sales, warranty begins on the date and mileage of retail sale.



3.5L V6
Reman Engine



2.8L I4
Reman Engine

The Technical Side (cont'd.)

"Mini-Segment" 2013 Spark Offers More

Spark brings the party – as everyone is looking for a unique vehicle – U.S. models differ in features and content from those sold in other parts of the world.

Though small on the outside, Spark offers more passenger and cargo room than other mini-cars such as the Fiat 500, Smart Fortwo and the Scion iQ. Equipped with the Ecotec 1.25L four-cylinder engine and five-speed manual transmission, Spark offers competitive EPA-estimated fuel economy of 38 mpg on the highway.

While the Spark looks like a three-door hatch, designers cleverly disguised the rear doors by integrating the handles into the C-pillar area. The technique gives Spark its sporty appearance without sacrificing five-door comfort and utility.

A wheels-out, body-in stance, stretched windshield accentuated by a single arc roofline, body-color front door handles and body sides free of cladding make the Spark

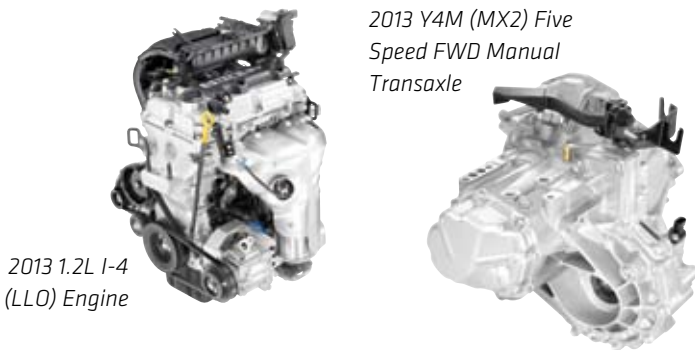
appear more sleek, aggressive and upscale. Spark's wheels-at-the-corners stance is further emphasized by standard 15-inch aluminum wheels.

Powertrain that saves gas.

The Spark is powered by an Ecotec 1.25L dual-overhead cam four-cylinder engine with continuously variable valve timing that delivers SAE-certified 84 horsepower (64 kW). It is mated to a standard five-speed manual transmission, and a four-speed automatic transmission is available.

The Spark achieves an EPA-estimated 34 mpg in combined city and highway driving with the manual transmission, and 32 mpg with the automatic transmission.





2013 1.2L I-4
(LLO) Engine

2013 Y4M (MX2) Five
Speed FWD Manual
Transaxle

It also uses regular unleaded fuel, while the Fiat 500 requires premium fuel.

The engine was developed using best practices from GM Powertrain technical centers. For North America, its displacement was enlarged slightly over other markets' 1.2L displacement, giving the engine more mid-range torque that translates into a greater feeling of power on the highway. It also combines competitive performance with sophisticated technologies such as dual continuous variable cam phasing and an electronically controlled thermostat to give customers a low-maintenance engine with reduced emissions.

Spark's body-frame-integral structure is tight and stiff for sportier driving dynamics. The electric power steering and MacPherson strut front suspension are designed to deliver taut, tight handling characteristics that better connect the driver with the road and provide outstanding overall stability. Anti-lock brakes, StabiliTrak electronic stability control and Hill Start Assist are standard.

Spark is equipped with vented front disc and rear drum brakes for excellent stopping performance and good pedal feel. Low rolling-resistance tires use a silica compound and revised tread design for a solid road feel and improved fuel efficiency.

Even though the 2013 Spark is a new vehicle, extensive service and repair information resources are a click away at www.gmtechinfo.com –*Electronic Service Information*. Technicians and shop owners can log on to the site to gain access to subscription services for service procedures and repair manuals. A complete Service Manual is accessible 24/7 through a subscription to the site. Free repair procedures are also available by going to www.genuinegmparts.com.



The 2013 Spark was
a hit at the SEMA
Show last November
in Las Vegas.

2013 Spark (U.S./Canada) Service Procedures

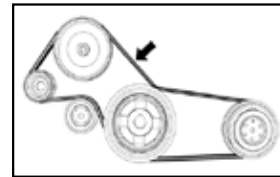
Water Pump and Generator Belt Replacement Special Tools

GE-50576 Acoustic Belt Tension Tester

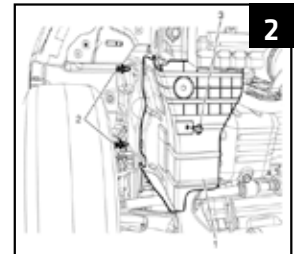
For equivalent regional tools, refer to *Special Tools*.

Removal Procedure

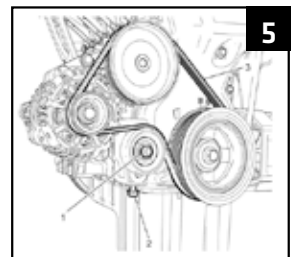
- 1** Support and raise the vehicle. Refer to *Lifting and Jacking the Vehicle*.



Note: The routing of the water pump and generator belt.



- 2** Remove the front compartment splash shield retainers (2) and bolt (3).
- 3** Remove the front compartment splash shield (1).
Warning: Always allow the engine to cool before servicing the engine system. Failure to follow this instruction may result in serious personal injury.
- 4** Remove the air conditioning compressor belt, if applicable. Refer to *Air Conditioning Compressor Belt Replacement*.
- 5** Loosen the generator bracket with tensioner nut (1).
- 6** Rotate the generator bracket with tensioner adjustment bolt (2) 12 full turns counterclockwise to relieve the belt tension.
- 7** Remove the water pump and generator belt (3).



Installation Procedure

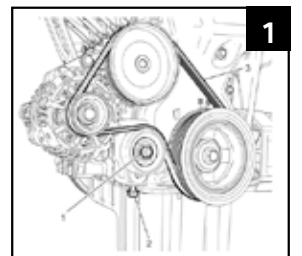
- 1** Install the water pump and generator belt (3).

Note: Make sure tensioner adjustment bolt is properly seated and perpendicular to the pulley.

- 2** Apply tension to belt by rotating adjusting bolt (2) 12 full turns clockwise.

Caution: Refer to Fastener Caution.

Note: The water pump and generator belt tensioner nut must be tightened prior to measuring the tension or an inaccurate belt tension will occur.



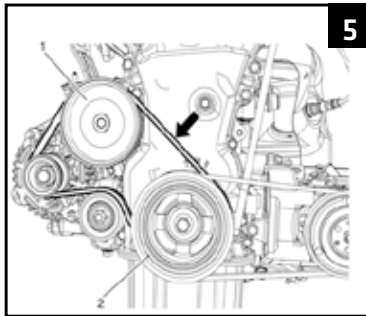
The Technical Side (cont'd.)

3 Tighten the generator bracket with tensioner nut (1) to 55 N·m (41 lb ft).

4 Rotate engine one full revolution.
Note: If there are loud sources of noise nearby, the values measured by the acoustic belt tester may not correspond to actual values.
Note: Space between tension gauge and the belt should be around 10 mm apart.

5 Use GE-50576 acoustic belt tension tester to measure the drive belt tension.

5.1 Locate GE-50576 acoustic belt tension tester near the center of the belt span between the water pump pulley and crankshaft pulley.



5.2 Locate a finger on the center of the belt span between water pump pulley (1) and crankshaft pulley (2). Pluck the belt between the water pump pulley and the crankshaft pulley. Repeat 3 times to get an average tension result on GE-50576 acoustic belt tension tester.

5.3 The drive belt tension should be set to the following specification:

Specifications

• Used belt: 261–272 Hz • New belt: 319–330 Hz

6 If the measured belt tension does not meet specification, please repeat step 2–5.

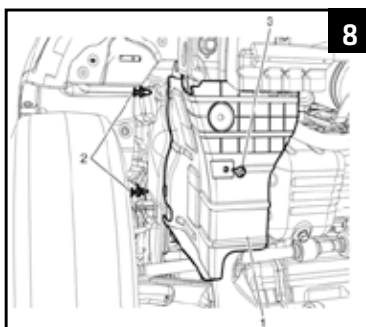
Definition

• Used belt: Vehicle driven for greater than 10 miles.
 • New belt: New service parts with the vehicle driven less than 10 miles.

7 Install the air conditioning compressor belt, if applicable. Refer to *Air Conditioning Compressor Belt Replacement*.

Note: Make sure the drive belt is correctly aligned and seated into the grooves of the accessory drive pulleys.

8 Install the front compartment splash shield (1).



9 Install the front compartment splash shield retainers (2) and bolt (3).

10 Tighten the bolt (3) to 9 N·m (80 lb in).

11 Lower the vehicle.

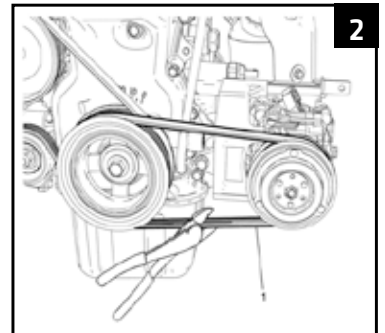
Air Conditioning Compressor Belt Replacement

Removal Procedure

1 Remove the right front compartment splash. Refer to *Front Compartment Splash Shield Replacement*.

2 Cut the air conditioning (A/C) belt (1) with a appropriate cutting tool as shown.

3 Remove and discard the air conditioning (A/C) belt (1).

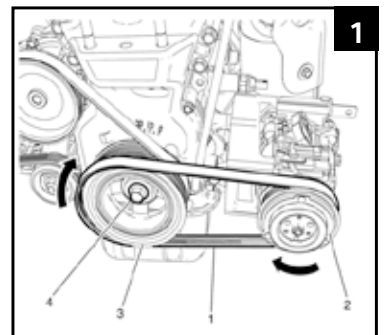


Installation Procedure

1 Position a NEW air conditioning (A/C) belt (1) on the crankshaft pulley (3) and air conditioning (A/C) compressor (2) as shown.

Note: Push the on belt while rotating the crankshaft pulley.

2 Using a socket and ratchet on the crankshaft pulley bolt (4), rotate the crankshaft in the direction of the arrow until the belt (1) is fully installed on the air conditioning (A/C) compressor (2).



3 After the belt is on the air conditioning (A/C) compressor pulley (2), rotate the crankshaft (3) an additional complete revolution and ensure the air conditioning (A/C) belt (1) is fully seated on the crankshaft (3) and air conditioning (A/C) compressor (2).

4 Install the front wheelhouse liner inner front extension. Refer to *Front Compartment Splash Shield Replacement*.

This example of **Water Pump and Generator Belt Replacement and Air Conditioning Compressor Belt Replacement** for the 2013 Chevrolet Spark is just one of many found in their Service Repair Manuals. By following the proper repair procedures, technicians can ensure that each vehicle maintains its solid performance and uncompromised safety features for the life of the vehicle.

Business of Repairs

Powertrain Assemblies Added to Genuine GM Rewards

No hoops, hurdles, long forms or frustration-induced short fuses. When you buy qualifying GM Powertrain Assemblies (Engines and Transmissions) and Components that are eligible for rebates under the new Genuine GM Rewards program, claiming your reward is simple, receiving them is certain.

In designing the loyalty program, which gives reward points for purchases of GM Powertrain Components and Assemblies, Genuine GM Parts made it very user-friendly. Rather than filling out and sending forms, purchase orders, receipts and the like, Independent Service Centers (ISCs) establish a personal ID and on-line wallet at www.genuinegmrewards.com after securing enrollment credentials from their GM dealer. Qualifying purchases are automatically calculated for the reward, logged and deposited monthly into a personal account that's viewable 24/7. "A reward is only as good as the ability to both actually obtain it and use it for something of value," says John Eck, marketing manager for GM Customer Care and Aftersales. "We know how frustrating some rewards programs can be in terms of filling out extensive and cumbersome paperwork and following exact procedures. So we designed the redemption process of the program from the inside out, in a sense, putting ourselves in the position of the busy ISC that loves rewards but often hates the process of claiming them."

Eligible GM Powertrain Assemblies and Component parts span a broad mix of those commonly used in major vehicle repairs. For more information on the Genuine GM Rewards program, talk to your GM dealer or visit www.genuinegmparts.com.

PRODUCT	REWARD
Powertrain Components	4% of Dealer List
Engine/Transmission Assemblies	50 Pts.
<i>Each Reward Point = \$1</i>	

Genuine  | **Parts**



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**We're one stop. For your shop.
Genuine GM Parts Engines and
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CLIP AND PLACE BY YOUR TELEPHONE

*Give us a call for all of your Genuine GM Parts
needs – all at one convenient location.*

Genuine  | **Parts**